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Abstract : Seasonal changes in the lipid content of adipose tissue reflect changes in a marine mammal's nutritional status and reveal details about ecology and life history. However, since adipose tissue is not necessarily a homogeneous mass, the anatomical location of sampling may affect the interpretation of lipid changes. We collected superficial fat from adult polar bears in western Hudson Bay from fall 2001 to spring 2003. Males (n=48) and females (n=67) were sampled each fall, and females with cubs (n=16) each spring. Data were split into fall/spring sampling periods in 2001-02 and 2002-03 to examine seasonal and interannual trends (2-way ANOVA). In fall, adipose tissue of females had higher %lipid (mean±SD: 74.6±6.34%) than males (70.3±7.01%; $P<0.001$), which may reflect relative differences in physiological preparation for reproduction and fasting. Females had higher %lipid in fall (74.6±6.34%) than in spring (70.1±8.58%; $P<0.001$), but this was mainly driven by the 2002-03 sampling period (i.e., interaction term: $P=0.012$). However, when only solitary fall females were considered, the seasonal effect remained ($P=0.031$) and the interaction disappeared ($P=0.287$). The fall-to-spring decrease in %lipid is consistent with declining female body condition while ashore. Both the male/female and spring/fall differences are contrary to previously published results, which may not have controlled for some sampling biases. Adipose tissue of solitary females in fall had the highest lipid content of all sampled bears (n=17; 76.6±6.90%), but was not significantly different than females with cubs in fall (n=50; 74.0±6.06%; $P=0.127$). To examine anatomical variation, we collected fat from hunter-killed bears in fall 2002: males (n=7) were sampled at the rump, belly, and baculum, and females (n=5) at the rump and belly. Neither %lipid (males: ANOVA $P=0.379$; females: paired t-test $P=0.780$) nor fatty acid composition (MANOVA males: $P=0.941$; females: $P=0.541$) varied across sites, indicating that any site will provide accurate information on composition.